

WHAT IS CLAIMED IS:

5

1. A data transfer method which routes multiple data frames from a preceding node to a next node in a network of communication units, comprising the steps of:

10 detecting whether the multiple data frames received from the preceding node include different destinations;

detecting whether the data frames that are detected as including different destinations include identical messages;

15 assembling the data frames that are detected as including different destinations and identical messages into an integrated data frame, so that the integrated data frame is transmitted to the next node;

20 supplying a selected next-node equipment identifier, the next-node equipment identifier indicating a selected next-node communication unit of the network that receives the integrated data frame; and

transmitting, when the selected next-node equipment identifier and the integrated data frame are received, the integrated data frame to the selected next-node communication unit via the network.

25

30 2. The data transfer method according to claim 1, further comprising the step of supplying a next-node conformance equipment identifier, the next-node conformance equipment identifier indicating a next-node communication unit that conforms to the data transfer method and is selected from among the communication units of the network.

35

3. A communication apparatus which routes multiple data frames from a preceding node to a next node in a network of communication units in accordance with a data transfer method, comprising:

5           a data destination detection unit detecting whether the multiple data frames received from the preceding node include different destinations;

          a data content detection unit detecting whether the data frames that are detected as including different destinations include  
10 identical messages;

          a data frame assembling unit assembling the data frames that are detected as including different destinations and identical messages into an integrated data frame, so that the integrated data frame is transmitted to the next node;

15           a next-node equipment selection unit supplying a selected next-node equipment identifier, the next-node equipment identifier indicating a selected next-node communication unit of the network that receives the integrated data frame from the data frame assembling unit; and

20           a data frame transmitter unit transmitting, when the selected next-node equipment identifier and the integrated data frame are received, the integrated data frame to the selected next-node communication unit via the network.

25

4. The communication apparatus according to claim 3, further comprising a conformance equipment detection unit supplying a  
30 next-node conformance equipment identifier to the next-node equipment selection unit, the next-node conformance equipment identifier indicating a next-node communication unit that conforms to the data transfer method and is selected from among the communication units of the network.

35

5. The communication apparatus according to claim 3, further comprising:

a data storage device storing the received data frames;  
a network traffic extraction unit detecting whether data  
5 traffic in the network is lower than a given reference level; and  
a data transmission timing control unit sending, when the  
data traffic in the network is detected as being lower than the  
reference level, the stored data frames from the data storage device  
to the data frame assembling unit.

6. The communication apparatus according to claim 3, further  
15 comprising a next-node equipment collecting unit receiving an  
optimum next-node equipment identifier from an external system.

7. The communication apparatus according to claim 4, further  
20 comprising a next-node equipment determination unit determining  
an optimum next-node equipment identifier from a communication  
equipment list by using the conformance equipment detection unit.

8. The communication apparatus according to claim 3, further  
30 comprising:

a failure notification unit notifying failure information as to  
the communication units of the network and transmission lines  
thereof to the data frame assembling unit when a failure is detected  
in the network; and

35 a data transfer cancellation unit partially canceling the  
transfer of the data frames to the communication unit that is  
detected as being defective or in failure.

TO SEE SEE 21850